



**THE PORT AUTHORITY  
OF NY & NJ**

*Peter K. Sweeney*  
ENGINEERING PROGRAM MANAGER - WORLD TRADE

*Alfred Aronin*  
CHIEF MECHANICAL ENGINEER

No. Date Revision Approved

Engineering Department  
Design Division

The World Trade  
Center

Electrical/HVAC  
Upgrade Program

Title  
**TOWER ONE AND TWO  
LOW VOLTAGE  
SUBSTATIONS  
CONSTRUCTION AND  
INSTALLATION**  
  
**MECHANICAL**  
  
**GENERAL NOTES  
AND LEGEND**

This drawing subject to conditions in contract.  
All inventions, ideas, designs and methods  
herein are reserved to Port Authority and  
may not be used without its written consent.

A.B./E.E. E.E. S.W.  
Designed by Drawn by Checked by

Date 5/1/95 Scale AS NOTED

Contract Number Drawing Number  
**WTC-802.071 M-1**

## GENERAL NOTES

WORK TO BE DONE UNDER THIS CONTRACT IS SHOWN BY HEAVY LINES AND SUPPLEMENTED BY NOTES ON THE CONTRACT DRAWINGS AND SPECIFICATION BOOKLET.

DIMENSIONS, LOCATIONS AND CONDITIONS SHOWN ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO STARTING WORK.

THE INSTALLATION UNDER THIS CONTRACT SHALL INCLUDE ALL INCIDENTAL SERVICES NECESSARY TO MAKE THIS INSTALLATION COMPLETE, FUNCTIONAL AND OPERABLE. THE CONTRACTOR SHALL BE RESPONSIBLE TO PERFORM THE FINAL ACCEPTANCE TEST OF ALL WORK UNDER THIS CONTRACT.

RELOCATE UTILITIES AS REQUIRED TO PERFORM WORK OF THIS CONTRACT. THE CONTRACTOR SHALL SUBMIT DRAWINGS OF THE PROPOSED RELOCATION AND RECEIVE APPROVAL BY THE ENGINEER PRIOR TO RELOCATING UTILITIES. THE CONTRACTOR SHALL PROVIDE FOR REPAIRING INCIDENTAL DAMAGES RESULTING FROM HIS OPERATIONS OF ALL RELOCATED PARTS TO MAKE THEM OPERABLE TO THE SATISFACTION OF THE ENGINEER.

THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT ALL UTILITIES AND EQUIPMENT FROM DAMAGE IN THE WORK AREAS. ANY UTILITIES AND/OR EQUIPMENT DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED OR REPLACED AT THE EXPENSE OF THE CONTRACTOR, TO THE SATISFACTION OF THE ENGINEER.

UNLESS SPECIALLY REQUIRED OTHERWISE, THE CONTRACTOR SHALL CONFORM TO THE MANUFACTURER'S STANDARDS AND RECOMMENDATIONS WHEN INSTALLING EQUIPMENT AND MATERIALS AS APPROVED BY THE ENGINEER.

ALL EQUIPMENT AND MATERIALS SHALL BE INSTALLED AS SHOWN ON CONTRACT DRAWINGS. DEVIATION FROM THE CONTRACT DRAWINGS MAY BE MADE ONLY UPON THE APPROVAL OF THE ENGINEER.

THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE ADEQUATE VENTILATION TO ENABLE BOTH BUILDING TENANTS AND EQUIPMENT TO CONTINUE UNIMPEDED WITH ITS DAY TO DAY OPERATION WHILE THE CONTRACTOR PERFORMS WORK UNDER THIS CONTRACT.

THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE ADEQUATE EXHAUST OF WORK AREA DURING ALL WELDING ACTIVITIES.

THE CONTRACTOR SHALL SUBMIT DETAILED CONSTRUCTION PHASING PLAN(S) PRIOR TO STARTING THE WORK UNDER THIS CONTRACT. SUCH PLAN(S) SHALL DETAIL ALL TEMPORARY STRUCTURES AND EQUIPMENT NECESSARY FOR THE PROPER HANDLING OF THIS MATERIAL AND EQUIPMENT WITHOUT RISK OF DAMAGING ANY STRUCTURE AND EQUIPMENT. ALL SUCH PLAN(S) SHALL BE CERTIFIED BY A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF NEW YORK, AND SHALL BE APPROVED IN ITS ENTIRETY BY THE ENGINEER PRIOR TO COMMENCING THE WORK.

THE CONTRACTOR SHALL PROVIDE ONE WEEK NOTICE TO THE ENGINEER FOR ANY SHUTDOWN/ STARTING REQUIREMENTS.

THE CONTRACTOR SHALL COORDINATE THE WORK WHICH IS NOT SPECIFICALLY PHASED IN SUCH A MANNER TO AVOID CONFLICT WITH PHASES AND TIME FRAMES SET FORTH IN THIS CONTRACT.

THE CONTRACTOR WILL BE REIMBURSED FOR THE FOLLOWING WORK AT THE "NET COST" FOR SUCH WORK:

a. REMOVALS, RELOCATIONS AND/OR REPLACEMENT OF EXISTING UTILITY SERVICES WHICH ARE NOT INDICATED ON THE CONTRACT DRAWINGS AND WHICH OBSTRUCT THE INSTALLATION OF WORK OF THIS CONTRACT WHEN SO DIRECTED BY THE ENGINEER.

b. PROVIDING TEMPORARY MECHANICAL HEATING AND/OR COOLING TO TENANT AREAS DURING SHUTDOWNS OF MECHANICAL SYSTEMS, WHEN SO DIRECTED BY THE ENGINEER.

c. PROVIDING REMOTE AUDIBLE AND/OR VISUAL ALARM INDICATION FROM SUBSTATIONS HVAC LOCAL CONTROL PANELS TO LOCATIONS DESIGNATED BY THE ENGINEER, WHEN SO DIRECTED BY THE ENGINEER.

## CONTROLLED INSPECTION (NYC)







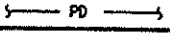






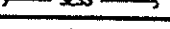
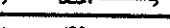
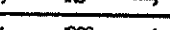
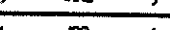
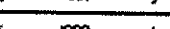



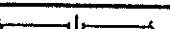


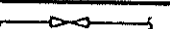

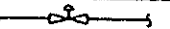





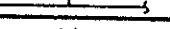
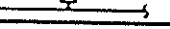







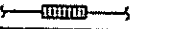
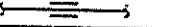





CONTROLLED INSPECTION - BUILDING CODE OF THE CITY OF NEW YORK - SECTIONS 27-152 AND 27-156.




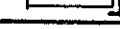


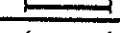

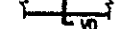



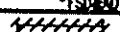
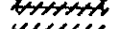

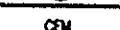

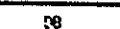

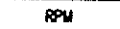
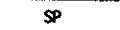








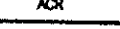

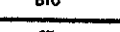

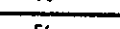
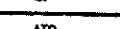
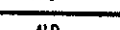



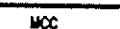
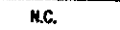


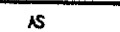


- ALL MATERIALS, EQUIPMENT, AND CONSTRUCTION, DESIGNATED BY THE CODE FOR "CONTROLLED INSPECTION" SHALL BE INSPECTED AND/OR TESTED TO VERIFY COMPLIANCE WITH THE CODE.
- ALL ITEMS OF WORK NOT SUBJECT TO CONTROLLED INSPECTION ARE SUBJECT TO SEMI-CONTROLLED INSPECTION IN ACCORDANCE WITH THE NYC BUILDING CODE.
- THE FOLLOWING LIST CONTAINS ITEMS SUBJECT TO CONTROLLED INSPECTION AND THE RELEVANT CODE REFERENCE WHERE APPLICABLE:

ITEM	NYC CODE REFERENCE
VENTILATION SYSTEM	27-779 27-780
HIGH PRESSURE STEAM SYSTEM	RULES AND REGULATIONS FOR HIGH PRESSURE STEAM PIPING.

## LEGEND

# LEGEND

	HPS	HIGH PRESSURE STEAM - 100 PSIG & OVER
	MPS	MEDIUM PRESSURE STEAM - 15-100 PSIG
	LPS	LOW PRESSURE STEAM - 0-15 PSIG
	MPR	HIGH PRESSURE CONDENSATE RETURN
	MPL	MEDIUM PRESSURE CONDENSATE RETURN
	LPR	LOW PRESSURE CONDENSATE RETURN
	PD	CONDENSATE PUMPED RETURN
	CHWS-H	CHILLED WATER SUPPLY - HIGH ZONE
	CHWR-H	CHILLED WATER RETURN - HIGH ZONE
	CHWS-L	CHILLED WATER SUPPLY - LOW ZONE
	CHWR-L	CHILLED WATER RETURN - LOW ZONE
	NWSS	NORTH & WEST ZONE SECONDARY WATER SUPPLY
	NWSR	NORTH & WEST ZONE SECONDARY WATER RETURN
	SESS	SOUTH & EAST ZONE SECONDARY WATER SUPPLY
	SESR	SOUTH & EAST ZONE SECONDARY WATER RETURN
	IRS	INTERIOR REHEAT HOT WATER SUPPLY
	IRSR	INTERIOR REHEAT HOT WATER REVERSED SUPPLY
	IRR	INTERIOR REHEAT HOT WATER RETURN
	IRRR	INTERIOR REHEAT HOT WATER REVERSED RETURN
	SWS	SECONDARY WATER SUPPLY
	SWR	SECONDARY WATER RETURN
	D	DRAIN LINE
	U	UNION
	S	STRAINER
	C	CHECK VALVE
	G	GATE VALVE
	G	GLOBE VALVE
	G	AUTOMATIC CONTROL VALVE (2-WAY)
	G	AUTOMATIC CONTROL VALVE (3-WAY)
	G	LUBRICATED PLUG VALVE
	G	CONDENSATE TRAP
	V	VENT
	T	THERMOMETER
	TW	THERMOMETER WELL
	PG	PRESSURE GAUGE
	TS	THERMOSTAT
	SW	SWITCH
	SD	SMOKE DETECTOR (DUCT)
	SC	SECTION CUT
	PA	PIPE ANCHOR
	EJ	EXPANSION JOINT
	PG	PIPE GUIDE
	RF	REDUCING FITTING
	TCP	TEMPERATURE CONTROL PANEL
	TT	TEMPERATURE TRANSMITTER
	TD	THERMOMETER (DUCT)
	PG	PRESSURE GAUGE
	FS	FREESTAT

	SA	SUPPLY AIR DUCT
	RA	RETURN OR EXHAUST AIR DUCT
	DC	DUCT CAP
	ER	EXISTING DUCTWORK OR PIPING TO REMAIN (SINGLE OR DOUBLE LINE)
	DI	DUCTWORK TO BE INSTALLED
	PI	PIPING TO BE INSTALLED
	VD	VOLUME DAMPER
	MD	MOTORIZED DAMPER
	FSD	FIRE SMOKE DAMPER AND ACCESS DOOR
	ER	EXISTING EQUIPMENT, DUCTWORK OR PIPING TO BE REMOVED (SINGLE OR DOUBLE LINE)
	CN	CONNECT NEW WORK TO EXISTING
	CFM	CUBIC FEET PER MINUTE
	FPM	FEET PER MINUTE
	DB	DRY BULB
	WB	WET BULB
	RPM	REVOLUTIONS PER MINUTE
	SP	STATIC PRESSURE
	HP	HORSE POWER
	BHP	BRAKE HORSE POWER
	PD	PRESSURE DROP
	WMS	WIRE MESH SCREEN
	IS	INTERIOR SUPPLY
	BR	BOTTOM REGISTER
	TR	TOP REGISTER
	ACS	AIR CONDITIONING SUPPLY
	ACR	AIR CONDITIONING RETURN
	GPM	GALLONS PER MINUTE
	BTU	BRITISH THERMAL UNIT
	ST	SOUND TRAP
	FC	FLEXIBLE CONNECTION
	EJ	EXPANSION JOINT
	ATC	AUTOMATIC TEMPERATURE CONTROLS
	ALD	AUTOMATIC LOUVER DAMPER
	AL	ACOUSTIC LINING
	M	MOTOR
	N.O.	NORMALLY OPEN
	MCC	MOTOR CONTROL CENTER
	N.C.	NORMALLY CLOSED
	MET	MECHANICAL EQUIPMENT ROOM
	OA	OUTSIDE AIR INTAKE
	AS	ACCESS SECTION
	NIC	NOT IN CONTRACT
	PA	PERIPHERAL SUPPLY (PRIMARY AIR)
	RCS	REHEAT COIL
	ACWS	AUXILIARY COOLING WATER SUPPLY
	ACWR	AUXILIARY COOLING WATER RETURN

I HEREBY CERTIFY THAT THIS IS A TRUE AND CORRECT COPY OF ONE OF THE CONTRACT DRAWINGS CONSTITUTING A PART OF CONTRACT NO. WTC-802.071 IN THE FORM IN WHICH SAID DRAWINGS EXISTED AT THE TIME THE SAID CONTRACT WAS EXECUTED BY THE PARTIES.

DATE 6/21/95 *Santhan A. Aslam*  
SPEC. WRITER

DATE 8/15/95 *Peter K. Sweeney*  
ENGINEER OF DESIGN